

Claims

What is claimed is:

1. A toner layer regulating system for an electrophotographic image forming apparatus, comprising:
 - 5 a toner carrier;
 - a toner regulating member disposed proximate said toner carrier, having a first surface disposed toward said toner carrier, and forming a nip with said toner carrier; said toner regulating member comprising a flexible metallic substrate and a metallic coating applied to cover an area of said first surface
 - 10 forming said nip; and
- wherein said coating comprises at least a material selected from the group consisting of molybdenum and tungsten carbide.
2. The toner regulating system of claim 1 wherein said coating has a thickness of not more than 30 um.
- 15 3. The toner regulating system of claim 1 wherein said coating is a thermal sprayed coating of a thickness of not more than 30 um.
4. The toner regulating system of claim 1 wherein said toner regulating member has a first portion mounted to a support and a second portion supported in cantilever fashion by said first portion; said nip disposed in said second portion.
- 20 5. The toner regulating system of claim 4 wherein said coating is limited to said second portion of said toner regulating member.

6. The toner regulating system of claim 1 wherein said substrate comprises a first material and said coating comprises a second material different from said first material.

7. The toner regulating system of claim 1 wherein said substrate has a thickness in the range of 0.02 mm to 0.20 mm.

5 8. The toner regulating system of claim 1 wherein said coating has a surface roughness of $\leq 2.0 \text{ }\mu\text{m Ra}$.

9. The toner regulating system of claim 8 wherein said coating has a surface roughness of $0.2 \text{ }\mu\text{m to } 1.5 \text{ }\mu\text{m Ra}$.

10. The toner regulating system of claim 9 wherein said coating has a surface
10 roughness of $0.7 \text{ }\mu\text{m to } 1.1 \text{ }\mu\text{m Ra}$.

11. The toner regulating system of claim 1 wherein said coating is substantially homogeneous.

12. The toner regulating system of claim 1 wherein said substrate has a generally plate-like appearance.

15 13. The toner regulating system of claim 1 wherein said coating is a thermal sprayed coating of a thickness of not more than $30 \text{ }\mu\text{m}$ and an as-applied surface roughness of $\leq 2.0 \text{ }\mu\text{m Ra}$.

14. The toner regulating system of claim 1:

wherein said coating is a thermal sprayed coating of a thickness of not more than 30 um;

wherein said substrate comprises a first material and said coating comprises
5 a second material different from said first material;

wherein said coating has a surface roughness of $\leq 2.0 \text{ um Ra}$;

wherein said coating is substantially uniform in composition; and

wherein said substrate has a generally plate-like appearance.

15. A toner layer regulating system for an electrophotographic image forming apparatus, comprising:

a toner carrier;

a toner regulating member disposed proximate said toner carrier and forming

5 a nip with said toner carrier, said toner regulating member having a first portion mounted to a support and a second portion supported in cantilever fashion by said first portion, said nip disposed in said second portion, said toner regulating member further having a first surface disposed toward said toner carrier;

10 said toner regulating member comprising a flexible metallic substrate and a coating over an area of said first surface forming said nip;

wherein said coating comprises a thermal sprayed metallic coating of not more than 30 um thickness, said coating comprising at least a material selected from the group consisting of molybdenum and tungsten;

15 wherein substrate comprises a first material and said coating comprises a second material different from said first material and said coating is limited to said second portion of said toner regulating member; and

wherein said coating has a surface roughness of $\leq 2.0 \text{ um Ra}$.

16. The toner regulating system of claim 15 wherein said toner carrier comprises a
20 developer roller.

17. The toner regulating system of claim 15 wherein said doctor blade extends beyond said nip in a direction away from said first portion.

18. The toner regulating system of claim 15 wherein said doctor blade is mounted to said support at a location downstream from said nip with respect to a direction said toner carrier carries toner.

19. The toner regulating system of claim 15:

5 wherein said coating has an as applied surface roughness of

0.2 um to 1.5 um Ra;

wherein said doctor blade extends beyond said nip in a direction away from
said first portion; and

wherein said doctor blade is mounted to said support at a location
10 downstream from said nip with respect to a direction said toner carrier
 carries toner.

20. A toner layer regulating system for an electrophotographic image forming apparatus, comprising:

a frame;

a doctor blade forming a nip with a toner carrier and comprising a flexible metallic substrate cantilevered from said frame, said doctor blade further comprising an external metallic coating disposed to cover at least a portion of a side of said flexible substrate proximate said nip;

wherein said coating comprises at least a material selected from the group consisting of molybdenum and tungsten; and

wherein said nip is formed between said coating and said toner carrier.

10 21. The toner regulating system of claim 20 wherein said toner carrier comprises a developer roller.

22. The toner regulating system of claim 20 wherein said coating has a surface roughness of $\leq 2.0 \text{ um Ra}$.

15 23. The toner regulating system of claim 23 wherein said coating has a surface roughness of $0.2 \text{ um to } 1.5 \text{ um Ra}$.

24. The toner regulating system of claim 20 wherein said doctor blade extends beyond said nip in a direction away from said frame.

25. A toner cartridge, comprising:
- a housing;
 - a toner carrier rotatably supported by said housing;
 - a toner regulating member disposed proximate said toner carrier, having a
- 5 first surface disposed toward said toner carrier, and forming a nip with said toner carrier; said toner regulating member comprising a flexible metallic substrate and a metallic coating disposed so as to cover said first surface in an area thereof forming said nip; and
- wherein said coating comprises at least a material selected from the group
- 10 consisting of molybdenum and tungsten.
26. The toner cartridge of claim 25 wherein said coating has a thickness of not more than 30 um.
27. The toner cartridge of claim 25 wherein said coating is a thermal sprayed coating of a thickness of not more than 30 um.
- 15 28. The toner cartridge of claim 25 wherein said toner regulating member has a first portion mounted for support by said housing and a second portion supported in cantilever fashion by said first portion; said nip disposed in said second portion.
29. The toner cartridge of claim 25 wherein said substrate has a thickness in the range of 0.02 mm to 0.20 mm.
- 20 30. The toner cartridge of claim 25 wherein said coating has a surface roughness of ≤ 2.0 um Ra.

31. The toner cartridge of claim 30 wherein said coating has a surface roughness of 0.2 um to 1.5 um Ra.

32. The toner cartridge of claim 31 wherein said coating has a surface roughness of 0.7 um to 1.1 um Ra.

5 33. The toner cartridge of claim 25 wherein said coating is substantially homogeneous.

34. The toner cartridge of claim 25 wherein said substrate has a generally plate-like appearance.

35. The toner cartridge of claim 25 wherein:

10 said coating is a thermal sprayed coating of a thickness of not more than 30 um;

 said toner regulating member has a first portion mounted for support by said housing and a second portion supported in cantilever fashion by said first portion; said nip disposed in said second portion;

15 said substrate has a thickness of approximately 0.075 mm; and
 said coating has a surface roughness of ≤ 2.0 um Ra.

36. An image forming device, comprising:

a latent image carrier;

a toner carrier rotatably supported by said housing and supplying toner to
said latent image carrier;

5 a toner regulating member disposed proximate said toner carrier, having a
first surface disposed toward said toner carrier, and forming a nip with said
toner carrier; said toner regulating member comprising a flexible metallic
substrate and a metallic coating disposed to cover an area of said first
surface forming said nip; and
10 wherein said coating comprises at least a material selected from the group
consisting of molybdenum and tungsten.

37. The image forming device of claim 36 wherein said coating has a thickness of
not more than 30 um.

38. The image forming device of claim 36 wherein said coating is a thermal
15 sprayed coating of a thickness of not more than 30 um.

39. The image forming device of claim 36 wherein said toner regulating member
has a first portion mounted for support by said housing and a second portion supported
in cantilever fashion by said first portion; said nip disposed in said second portion.

40. The image forming device of claim 36 wherein said substrate has a thickness in
20 the range of 0.02 mm to 0.20 mm.

41. The image forming device of claim 36 wherein said coating has a surface roughness of $\leq 2.0 \text{ um Ra}$.

42. The image forming device of claim 41 wherein said coating has a surface roughness of $0.2 \text{ um to } 1.5 \text{ um Ra}$.

5 43. The image forming device of claim 42 wherein said coating has a surface roughness of $0.7 \text{ um to } 1.1 \text{ um Ra}$.

44. The image forming device of claim 36 wherein said coating is substantially uniform in composition.

10 45. The image forming device of claim 36 wherein said substrate has a generally plate-like appearance, and wherein said toner carrier comprises a developer roller.

46. The image forming device of claim 36 wherein:

said toner carrier comprises a developer roller;

said coating is a substantially homogeneous thermal sprayed coating of a thickness of not more than 30 um ;

15 said toner regulating member has a first portion mounted for support by said housing and a second portion supported in cantilever fashion by said first portion; said nip disposed in said second portion;

said substrate has a thickness in the range of $0.02 \text{ mm to } 0.20 \text{ mm}$; and
said coating has a surface roughness of $0.2 \text{ to } 1.5 \text{ um Ra}$.

47. A toner layer regulating system for an electrophotographic image forming apparatus, comprising:

a toner carrier;

a toner regulating member disposed proximate said toner carrier, having a
5 first surface disposed toward said toner carrier, and forming a nip with said toner carrier; said toner regulating member comprising a flexible metallic substrate and a metallic coating applied on said first surface in an area thereof forming said nip.

48. The toner regulating system of claim 47 wherein said coating comprises at least

10 a material selected from the group consisting of molybdenum and tungsten carbide.

49. The toner regulating system of claim 48 wherein said material is the largest constituent component of said coating on a by weight basis.